



ST JOSEPH'S INSTITUTION
END-OF-YEAR EXAMINATION 2022
YEAR 1

CANDIDATE
NAME

Marking Scheme

CLASS

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INDEX
NUMBER

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GEOGRAPHY

26 September 2022

1 hour 20 minutes

Additional Materials : 3 pieces of Writing Paper

(0800-0920)

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use a soft pencil for any diagrams.

Do not use staples, paper clips, glue or correction tape/ fluid.

Answer **ALL** questions on writing paper.

Hand in Section A and Section B **SEPARATELY**.

The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use

40

This document consists of **14** printed pages including this cover page.

[Turn Over]

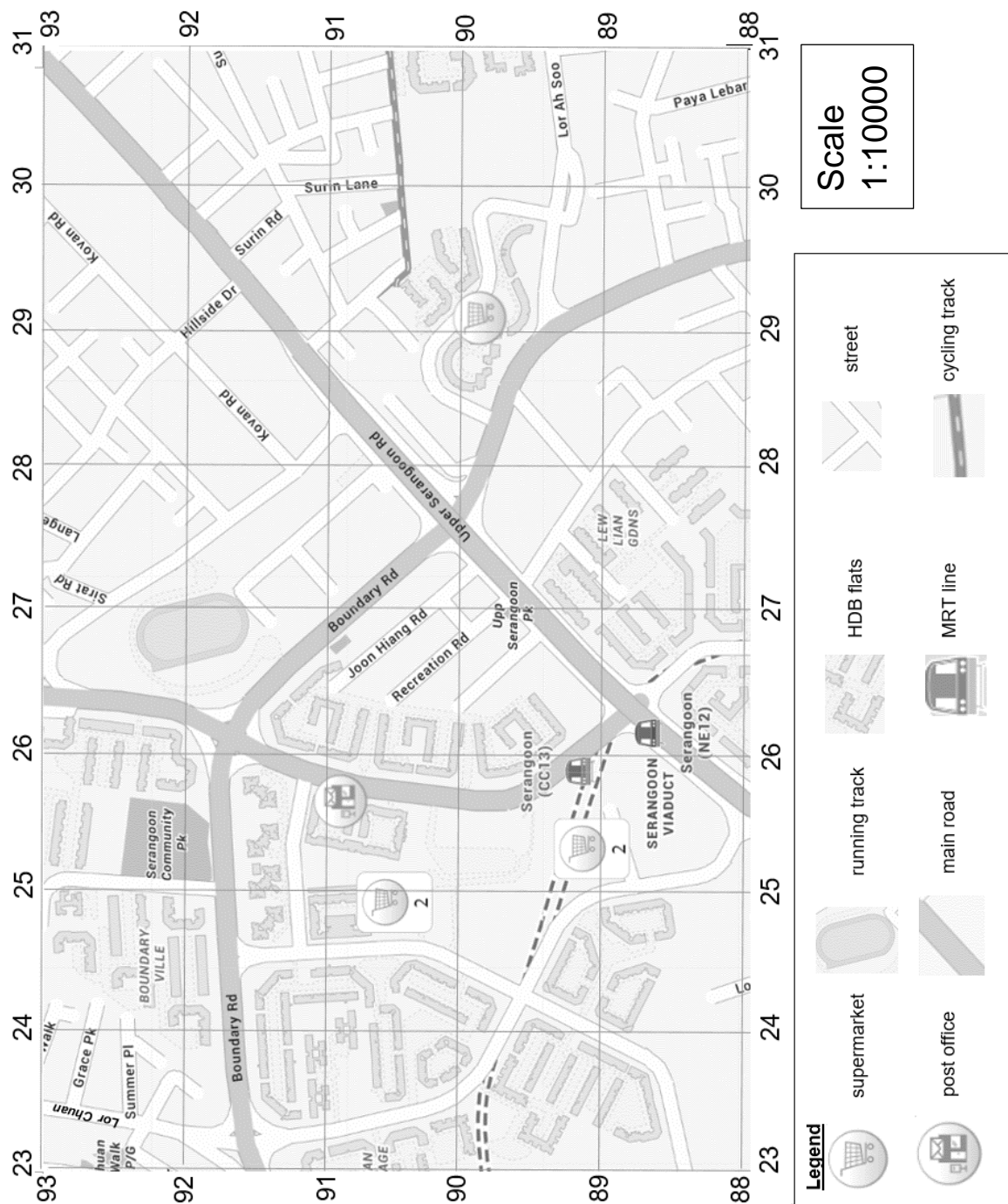
SECTION A: Structured Questions with Topographic Map Reading (22 marks)

Instructions:

Answer all questions on the writing paper provided. Remember to number your answers and leave lines between each answer.

- 1 Figure 1 shows a map extract of a residential part of Singapore.

Fig. 1



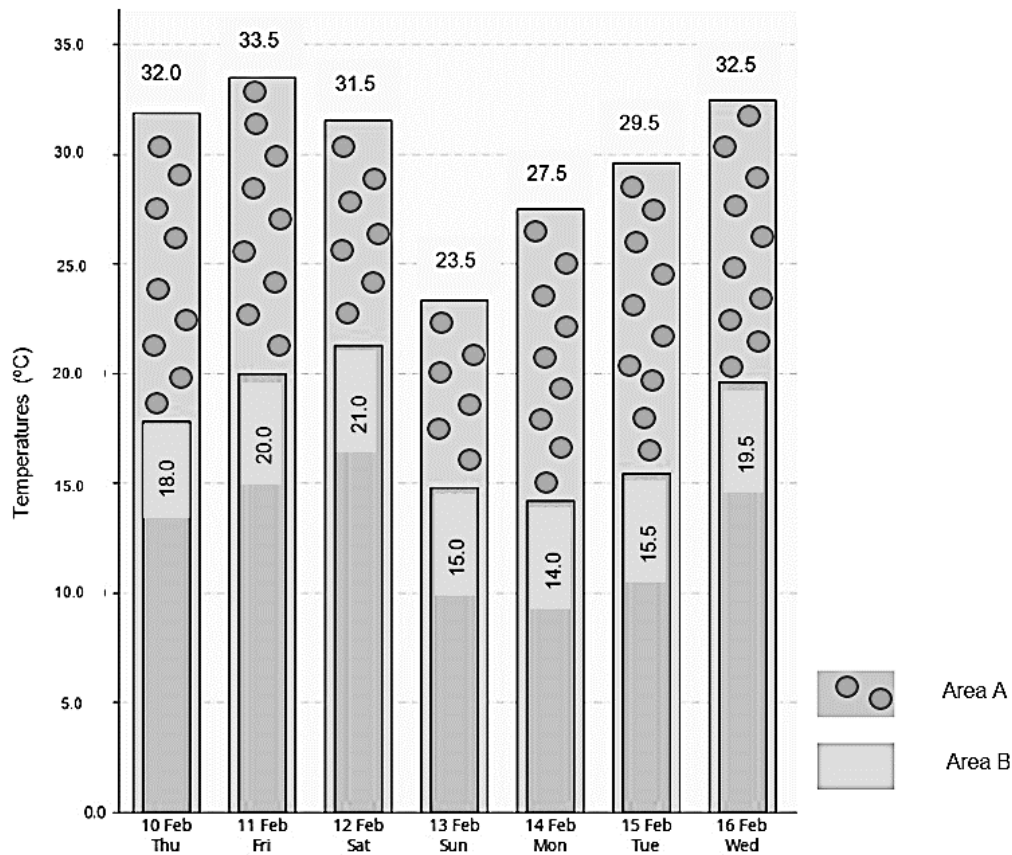
Source: <https://www.onemap.gov.sg/main/v2/essentialamenities>

- (a) A man is at Serangoon MRT station (CC13) and wishes to do grocery shopping at the nearest supermarket. **State** the direction he has to head towards. [1]
- *West*
- (b) **Name** a human feature found in 2590. [1]
- *Post office*
 - *HDB flats*
 - *Main road*
- [Any one of the above; ½ m awarded for 'road']*
- (c) **State** the 6-figure grid reference where the two main roads, Boundary Road and Upper Serangoon Road intersect. [1]
- *276901 (±1 on the 3rd and 6th digit)*
- (d) **Calculate** the straight line distance of the cycling track, in km. [1]
- *3.3cm x 10000 = 33000cm*

$$= 0.33\text{km}$$
- [Accept answers of accuracy from ±0.1km]*

2(a) Figure 2 shows the relationship between temperatures and cloud cover in Areas A and B, recorded over a 12-hour time period at night.

Fig. 2



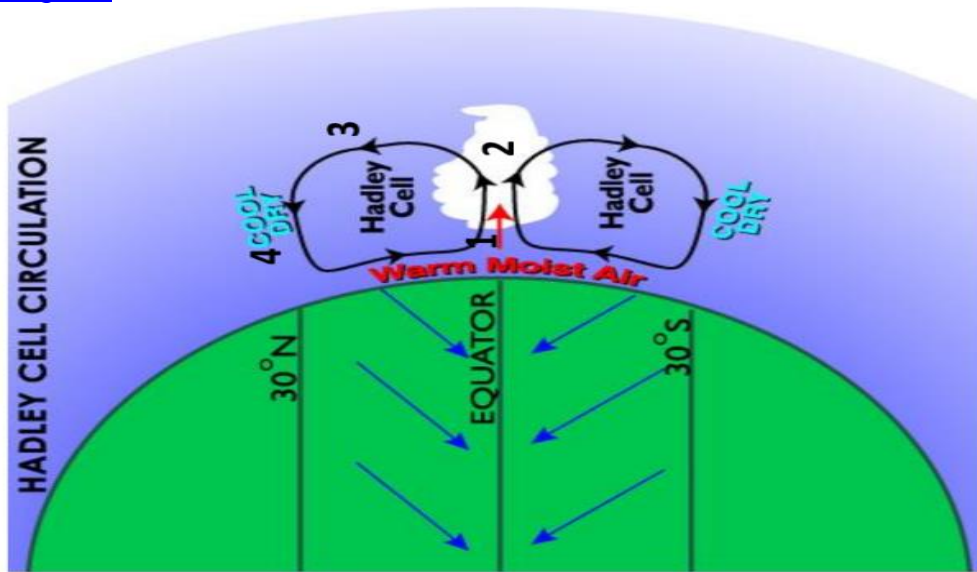
Source: <https://jamesspann/posts/501525254678836>

- (i) Study and use Fig. 2 to **identify** and **explain** which area, Area A or Area B, has thicker cloud cover. [2]
- *Identify: Area A has thicker cloud cover.*
 - *Point/Explanation: During the night, the presence of cloud cover will trap heat within the troposphere therefore giving rise to higher temperatures.*
 - *Evidence: This can be seen from the higher temperatures in Area A than Area B during all 7 days.*

- (ii) With the aid of a well-labelled diagram, **explain** why the subtropical regions have little or no cloud cover.

[4]

Diagram

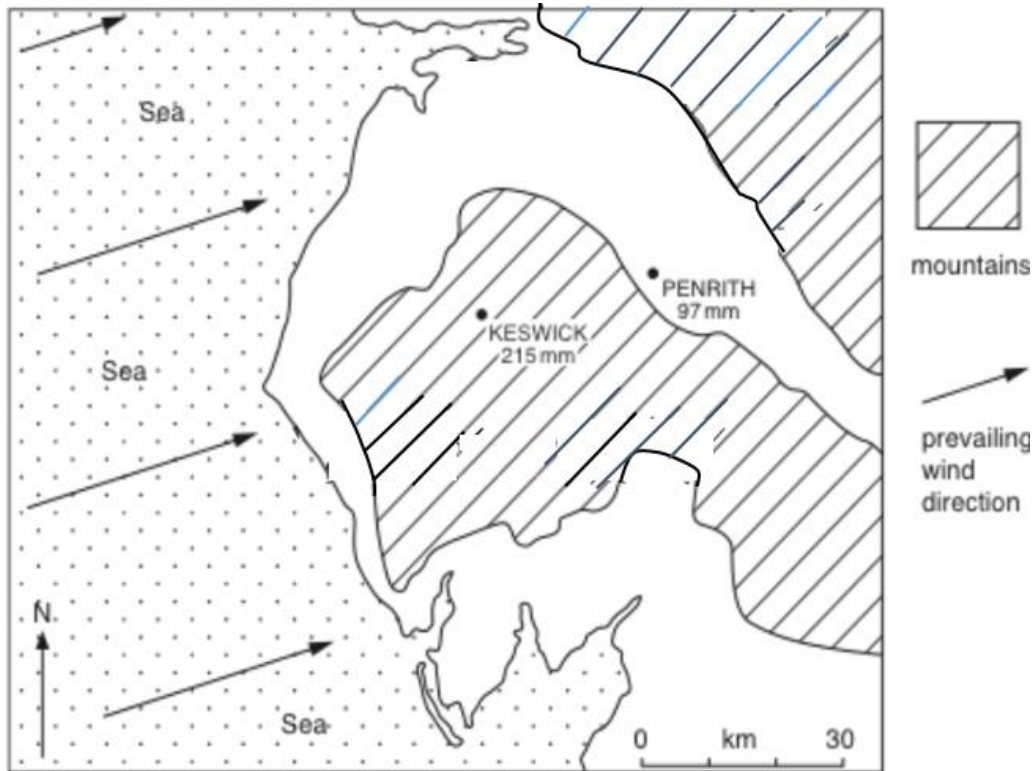


Explanation

- Subtropical regions are influenced by the atmospheric air pattern, Hadley Cell.
- Hot, moist air rises into the atmosphere near the Equator.
- As the air rises, it cools, condenses into water droplets, forming clouds and drops its moisture as heavy tropical rains at the Equator.
- The resulting drier air mass moves polewards, away from the Equator, and cools.
- As it approaches the tropics (15-30° North and South of the Equator) the dry cool air mass descends, warms up and becomes drier.
- The descending denser dry air mass suppresses the rising warm air mass from the Earth's surface, thus **hindering the formation of clouds**, so very little rain falls on the land below, resulting in an arid environment with desert like conditions. (*)

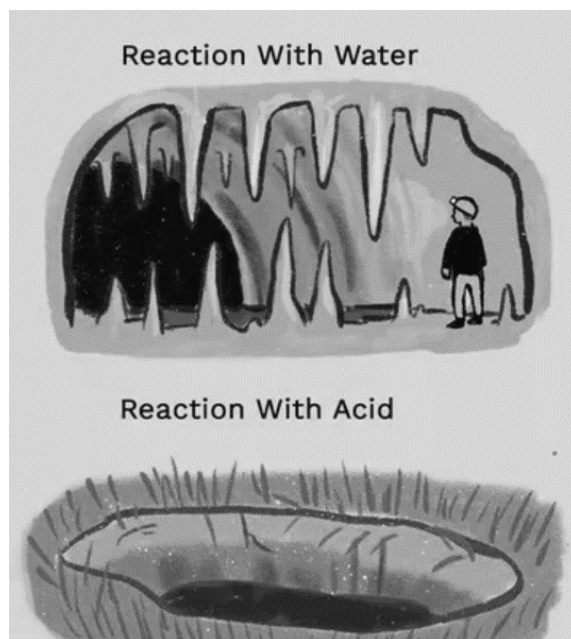
- (b) Figures 3A and 3B show a map with the locations of two weather stations, Keswick and Penrith, and a diagram indicating the impacts of rain on both areas, respectively.

Fig. 3A



Source: <https://www.metlink.org/resource/rain-wind-snow-and-fog/>

Fig. 3B



Source: <https://www.thoughtco.com/examples-weathering-607608>

- (i) Study and use Fig. 3A to **explain** why the two weather stations experience differing amounts of rainfall. [3]

- *Point: Keswick and Penrith are in different locations – Keswick is located on the mountain, whereas Penrith is located at the foot of the mountain.*

Explanation:

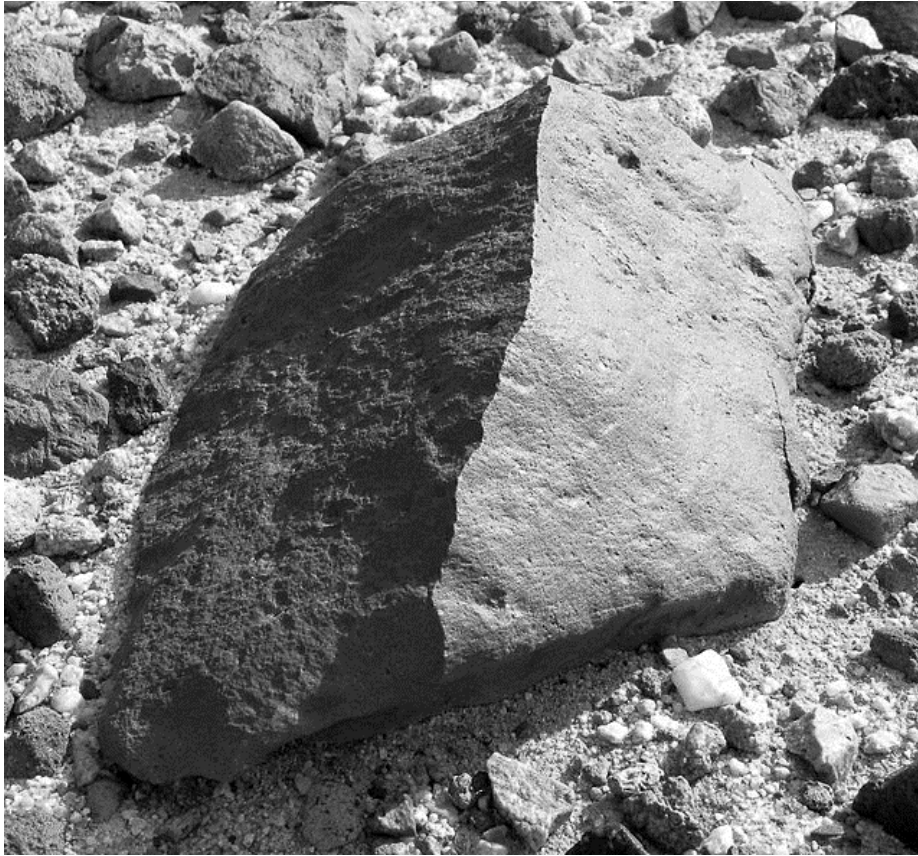
- *Keswick experiences the prevailing wind which is blowing towards the mountain. The prevailing wind carries with it warm moist air.*
- *The warm moist air from the sea is forced to rise, cools as it reaches dew point, forming clouds upon condensation.*
- *When water droplets are large and heavy enough they fall as relief rain on the windward side of the mountain where Keswick is located*
- *Thus it receives more rainfall at 215mm.*
- *By the time air parcel reaches the leeward side of mountain, much of the rain has already used up, resulting in cool air that is dry.*
- *Hence, lower rainfall of 97mm is received on the side of the mountain where Penrith is located.*

- (ii) Study Fig. 3B and **state** and **explain** how the type of weathering occurs. [3]

- *State: Chemical weathering*
- *Point: Chemical weathering occurs when water dissolves minerals in a rock, producing new compounds and this happens when water (i.e. rainwater) is present.*
- *Explanation: Acids may also be produced when water reacts with the carbon dioxide in the atmosphere; acidic water react with rocks to form new minerals.*

(c) Figure 4 shows a landform feature found in the arid tropical environment.

Fig. 4



Source: <https://www.wikiwand.com/en/>

- (i) Study and use Fig. 4 to **explain** how the power of wind shapes ONE characteristic of the landform feature. [2]
- *Characteristic 1: The left side of the ventifact has been eroded more than the right side of the ventifact.*
 - *Explanation 1: The left side of the ventifact probably experiences more wind erosion for a longer duration of time which then wears the side of the ventifact a lot more than the other side.*
 - *Characteristic 2: The right side of the ventifact is smooth and well-polished.*
 - *Explanation 2: Wind erosion, in the form of abrasion, lifts sand particles and “sand blast” rock surfaces, resulting in a smooth surface.*
- (ii) With the use of a diagram, **explain** how wind is also responsible for the breeze experienced in some parts of eastern Singapore during the day. [4]
- *Point: The differential heating of the land and sea leads to the difference in air pressure.*
- Explanation:*

- *As land is a better conductor of heat compared to the sea, land absorbs heat faster and warms up the air above it. This causes the air to expand, become less dense, creating a region of low air pressure above it.*
- *As the sea heats up less quickly, the air above the sea is cooler. Cool air sinks, creating a region of high pressure above the sea.*
- *Air travels from high pressure to low pressure regions in order to equalise the differences in air pressures, forming sea breeze.*

Diagram of sea breeze



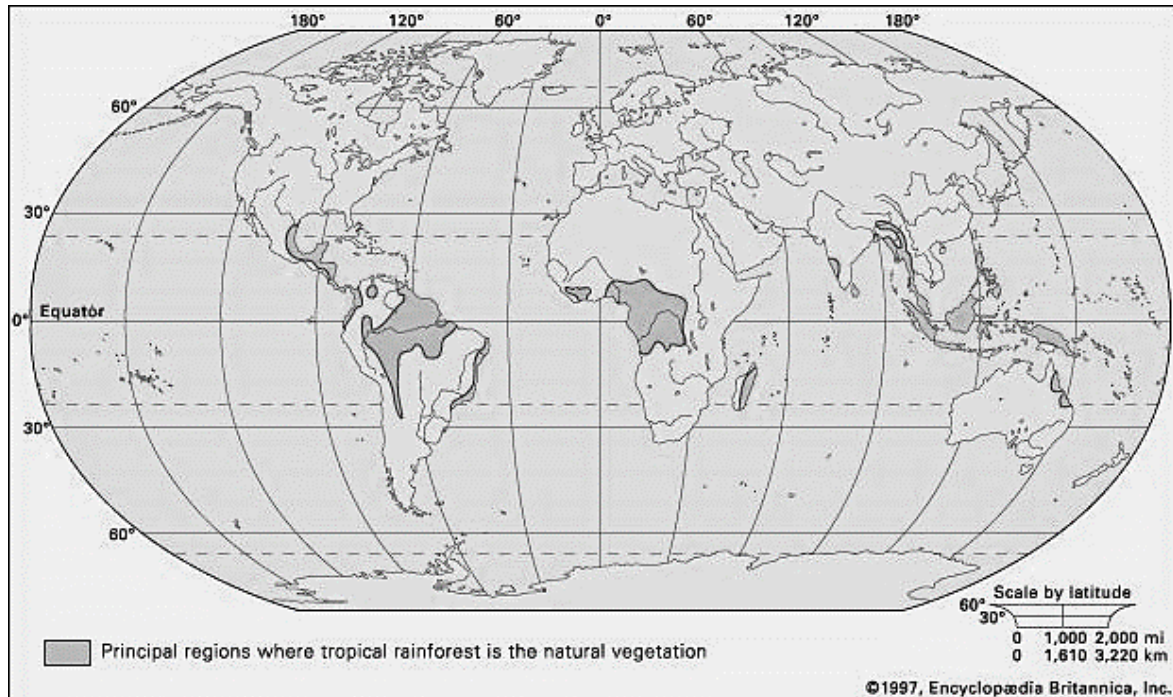
SECTION B: Structured Questions (18 marks)

Instructions:

Start this section on a separate piece of writing paper. Answer all questions on the writing paper provided. Remember to number your answers and leave lines between each answer.

3(a) Figure 5 shows a map of the distribution of tropical rainforests in the world.

Fig. 5



Source: https://useruploads.socratic.org/yQ91loZQnGTofOllxAqK_6578-004-A83EE287.jpg

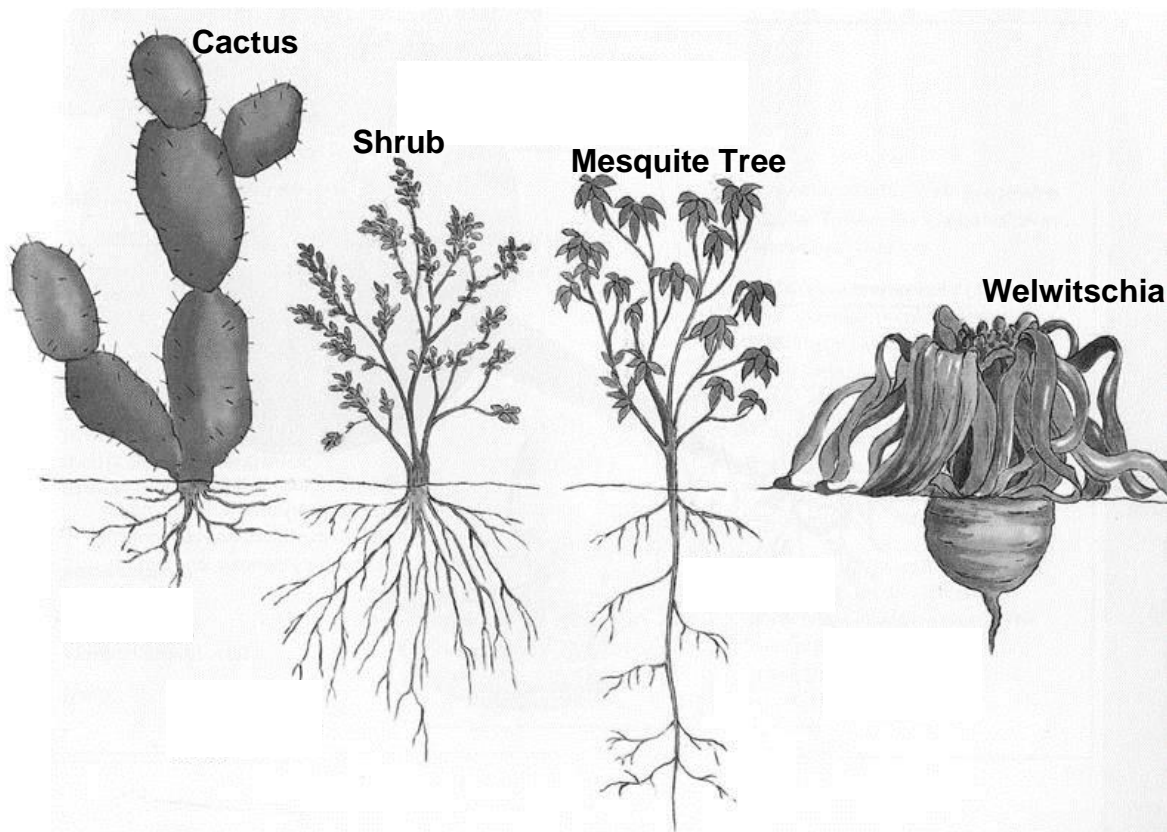
- (i) Study and use Fig. 5 to **describe** the spatial distribution of the tropical rainforests. [4]
- *Point: The tropical rainforests are found near the equator, between the Tropics of Cancer and Capricorn.*
 - *Elaboration & Evidence (1): The largest tract of tropical rainforests is the Amazon Basin Rainforest and it can be found in the north and west of South America. There are also some tropical rainforests in Central America.*
 - *Elaboration & Evidence (2): The African continent also has tropical rainforests. The Congo Basin Rainforest is found in central Africa. There are also tropical rainforests in Madagascar, in the east of Africa.*
 - *Elaboration & Evidence (3): The last tract of tropical rainforests can be found in Asia, especially in the Rainforests of Southeast Asia. There are also some tropical rainforests in Southwest of India and Northwest of Australia.*

(ii) **Explain** TWO atmospheric importance of tropical forests. [2]

- *Point & Explanation (1): Tropical forests have the ability to generate oxygen through photosynthesis in which they absorb carbon dioxide, water and sunlight to produce food for their own survival and growth. They are also capable of producing oxygen throughout the year as they are evergreen.*
- *Point & Explanation (2): Tropical forests contribute to carbon storage when they absorb carbon dioxide from the atmosphere during photosynthesis. This helps to balance the amount of carbon dioxide being added to the atmosphere through natural processes like respiration and decomposition.*

(b) Figure 6 shows the root system of different desert plants.

Fig. 6



Source: <https://4.bp.blogspot.com/-QORO5ze-MRQ/UjqxwI3kcI/AAAAAAAAACg/87zq5Etfqv4/s1600/50-plants-desert.jpg>

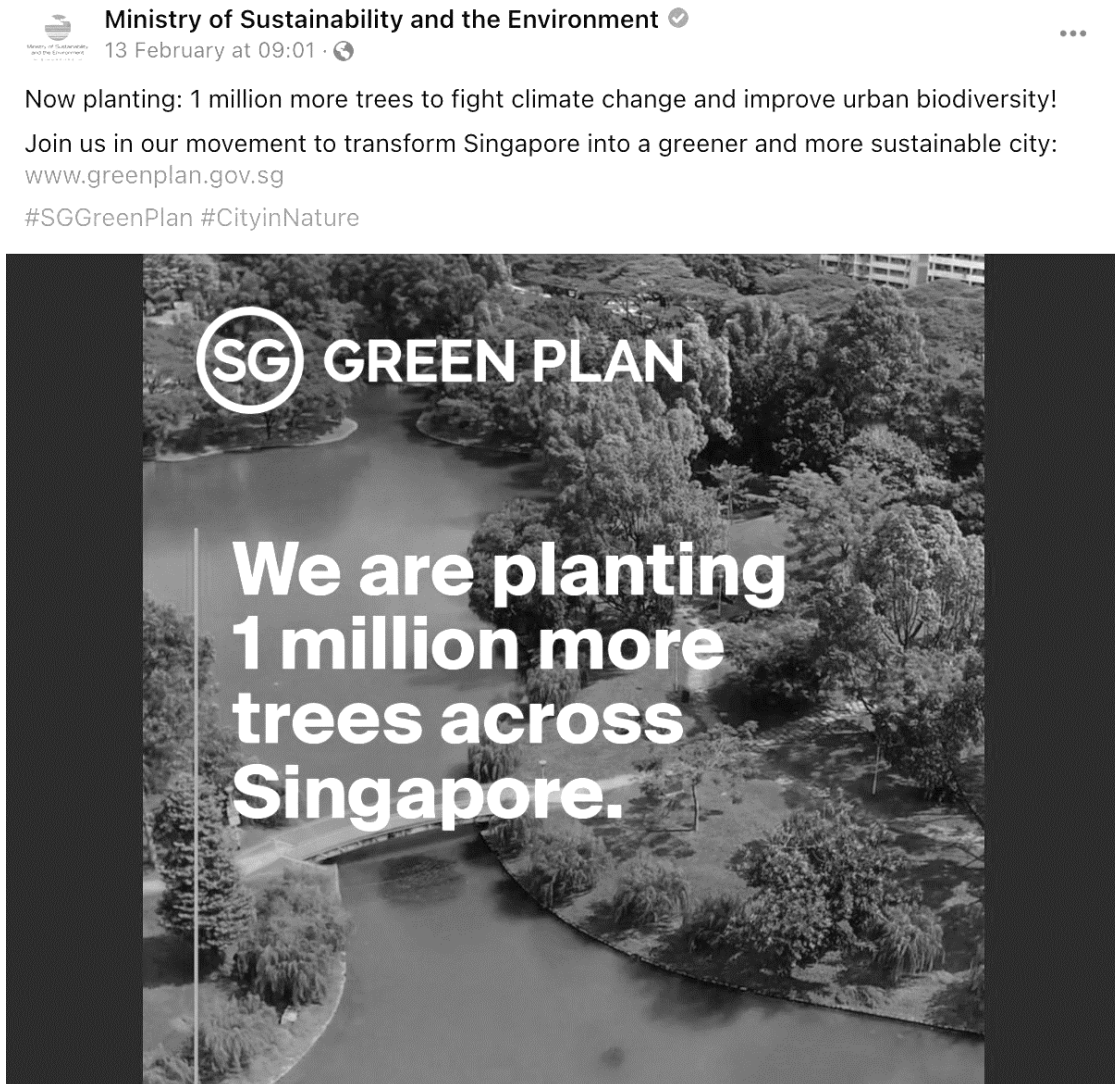
(i) Study and use Fig. 6 to **explain** how each of the root system helps the plants to survive in the arid tropical environment. [4]

- *The roots of the cactus are shallow so that during periods of infrequent rain, the shallow roots will quickly take in the rainwater as it seeps into the ground.*
- *The roots of the shrub is widespread so that during periods of infrequent rain, the widespread roots will be able to capture rainwater from different layers of the ground.*

- *The roots of the Mesquite tree is long and deep (tap roots) so that even during dry periods, the roots will be able to tap into the water deep in the ground.*
 - *The roots of the Welwitschia is tuber-like so that during periods of infrequent rain, it can store as much water for use during dry periods.*
- (ii) **Explain** TWO ways in which plants in the arid tropical environment adapt to high temperatures. [2]
- *Point (1): White coating on leaves and/or branches – Explanation (1): The white coating will reflect solar radiation off the leaves and/or branches reducing the heat absorption and therefore keeping the plant cool during high temperatures.*
 - *Point (2): East-west orientation leaves – Explanation (2): The leaves face the sun when it is rising and setting as the solar radiation during these times are lower compared to when noon time when the solar radiation is more intense.*
 - *Point (3): Presence of hair on leaves/spines on stems – Explanation (3): The presence of hair on leaves and spines will help reflect solar radiation from the plant so as to keep it cool during high temperatures.*

- (c) Figure 7 shows a media release on a strategy of the Singapore Green Plan 2030.

Fig. 7



Source: <https://pbs.twimg.com/media/Eudioa5VIAIdXhM.jpg:large>

With the use of examples, **explain** how this strategy and TWO other strategies help to sustainably manage the tropical forests in Singapore. [6]

Strategy: Rehabilitating disturbed areas

- *Point – The diversity of plant and animal species in deforested areas is usually much lower compared to the original tropical forest. Forest rehabilitation aims to re-introduce at least some of the plant and animal species which were originally found there.*
- *Explanation – Reforestation helps to rehabilitate a deforested area through the planting of new trees.*
- *Evidence – Just like in Singapore, the rehabilitation of mangrove forests has been carried out on Pulau Semakau. The then Ministry of the Environment and Water Resources assisted in the rehabilitation of the deforested areas by replanting a large number of mangrove seedlings.*

Strategy: Establishing protected areas

- *Point – A common strategy to conserve remaining tropical forests is to set them aside as protected areas.*
- *Explanation – Governments usually put laws in place to ensure that people do not damage these protected areas, such as by illegally cutting down trees or poaching exotic animals. People who break these laws can be fined heavily or sent to jail.*
- *Evidence – Singapore has a total of four protected areas, known as nature reserves. They are the Bukit Timah Nature Reserve, the Central Catchment Nature Reserve, Sungei Buloh Wetland Reserve and Labrador Nature Reserve. They are protected by the Parks and Trees Act (2005), that provides for the planting, maintenance and conservation of trees and plants within these nature reserves.*

Strategy: Promoting public education

- *Point – Public education is an important strategy in attempting to reduce deforestation and to encourage the sustainable extraction of resources from tropical forests.*
- *Explanation – If people know the importance of tropical forests and understand why they are under threat, they will be more likely to play a part in helping to reduce deforestation by changing their consumption pattern and/or their lifestyle.*
- *Evidence – In Singapore, the National Parks Board (NParks) regularly organises exhibitions, festivals, talks and workshops which people can take part in to learn more about tropical forests. It also publishes information like information boards along walking and cycling trails across Singapore.*

End-of-Paper